



HEALTH IMAGING

Publication No. 7C8770

19JAN99

Supersedes 7C8770

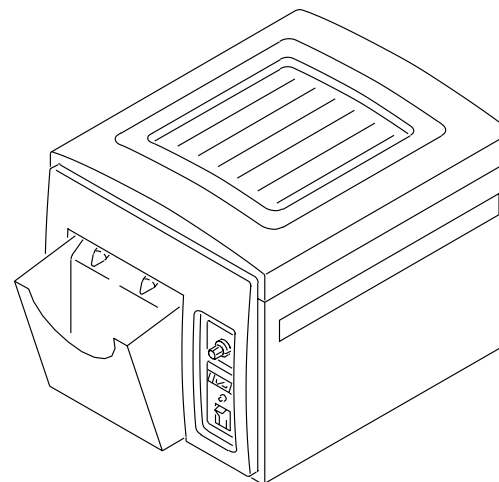
03DEC98

OPERATOR MANUAL

for the

Kodak X-Omat 2000 PROCESSOR

Kodak X-Omat 2000A PROCESSOR



PLEASE NOTE The information contained herein is based on the experience and knowledge relating to the subject matter gained by Eastman Kodak Company prior to publication.

No patent license is granted by this information.

Eastman Kodak Company reserves the right to change this information without notice, and makes no warranty, express or implied, with respect to this information. Kodak shall not be liable for any loss or damage, including consequential or special damages, resulting from any use of this information, even if loss or damage is caused by Kodak's negligence or other fault.



Warning

To avoid hazardous conditions, keep floors and floor coverings around your *Kodak X-Omat* Processor and associated drains clean and dry at all times. Any accumulation of fluids from mixing tanks, drain lines, etc., should be cleaned up immediately. In the event of an accumulation of liquid due to backup, overflow, or other malfunctions of the drain associated with your *X-Omat* Processor, call a plumber or other contractor to correct any problem with the drain. Kodak accepts no responsibility or liability whatsoever for the serviceability of any drain connected to or associated with a *Kodak X-Omat* Processor. Such drains are the sole responsibility of the customer.

Table of Contents

Description	Page
Overview	3
Processing Film	4
Start-Up	4
Feeding Sheet Film	6
Feeding Roll Film	6
Shutdown	7
Processing Solutions	8
Preparing the Solutions	8
Draining the Tanks	8
Filling the Tanks	10
Replenishment Flow Rates	11
Correcting Difficulties	13
Cleanup and Periodic Maintenance	15
Daily Procedure	15
Every Two Weeks	16
Special Maintenance for Low or High Volume Usage	18
New Equipment Warranty	20
Warranty Coverage	20
How to Obtain Service	20
Limitations	20

Section 1: Overview

The *Kodak X-Omat* 2000 and 2000A Processors are designed to process medical x-ray sheet or roll film that can be processed in *Kodak RP X-Omat* Developer and Replenisher and in *Kodak RP X-Omat* Fixer and Replenisher. The self-threading roller transport system has:

- a film-length detection system
- a replenishment system
- a developer solution filter
- a recirculation system for the developer and fixer solutions
- an automatic standby feature

The Processor can operate at 2 different transport speed cycles:

- Standard Cycle has a transport speed of 76.2 ± 2.0 cm (30 ± 0.6 in.) per minute or 157 ± 5 seconds drop time (dry to dry) for a 43 cm (17 in.) sheet of film. The developer temperature is 33.3 ± 0.3°C (92.0 ± 0.5°F).
- Rapid Cycle has a transport speed of 101.6 ± 1.5 cm (40.1 ± 0.8 in.) per minute or 118 ± 4 seconds drop time (dry to dry) for a 43 cm (17 in.) sheet of film. The developer temperature is 34.4 ± 0.3°C (94.0 ± 0.5°F).
- Both Cycles use standard *Kodak RP X-Omat* Fixer and Replenisher.

Note

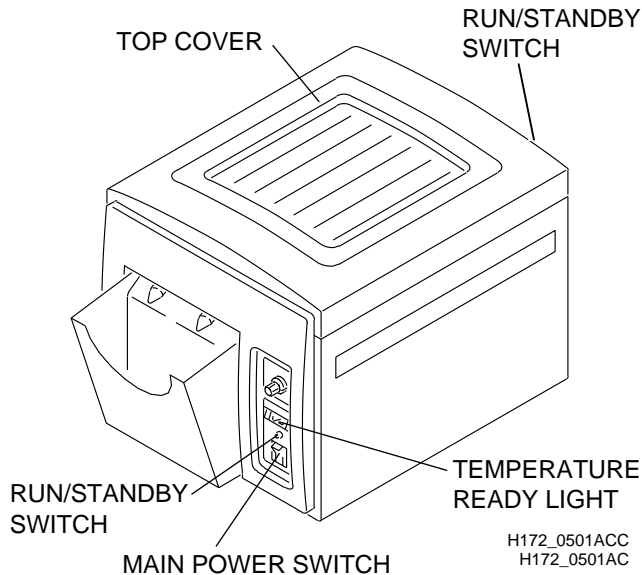
The transport speed can only be changed by qualified personnel.

A film feed signal sounds 3 seconds after the film being processed has cleared the Rollers of the Detector Crossover Assembly. This indicates that the Processor is ready to accept another piece of film.

Section 2: Processing Film

Start-Up

Figure 1 **Main Power Switch**

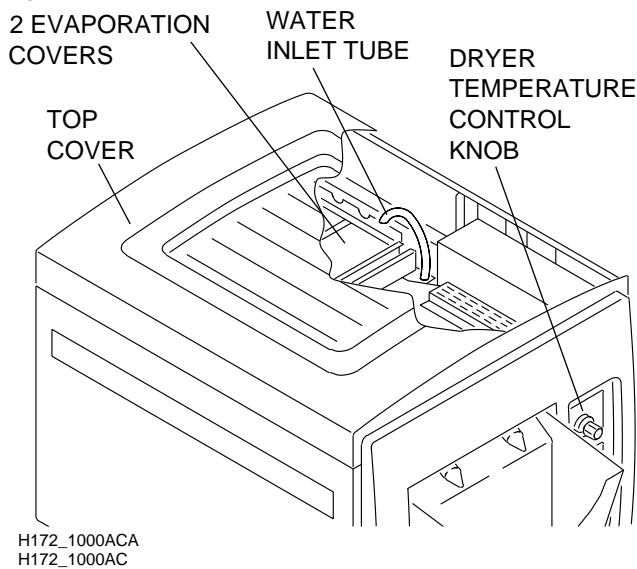


Warning

Keep fingers, clothing, cleaning materials, etc., away from the moving parts of the Processor.

- [1] Turn on the water supply and the Main Power Switch.
- [2] Remove the Top Cover.

Figure 2 **Water Inlet Tube of the Wash Tank**



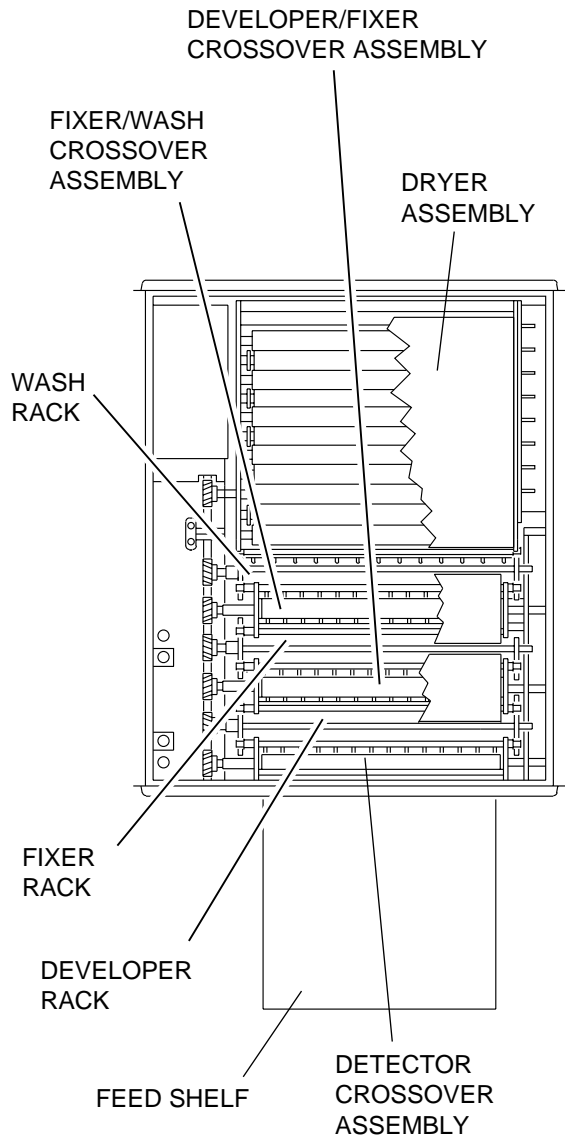
- [3] Check the following are seated correctly. (See Figure 3.)

- Developer Rack
- Fixer Rack
- Wash Rack
- Fixer/Wash Crossover Assembly
- Developer/Fixer Crossover Assembly
- Detector Crossover Assembly
- Dryer Assembly

- [4] Check:

- developer, fixer, and wash solutions are at the overflow level of the Weirs
- water is flowing from the Water Inlet Tube of the Wash Tank
- Evaporation Covers are installed

Figure 3 Racks and Crossovers



H172_1001CCA
H172_1001CC

- [5] Install the Top Cover on the Processor.
- [6] Allow the developer solution to reach the correct temperature.

Recommended developer temperatures:

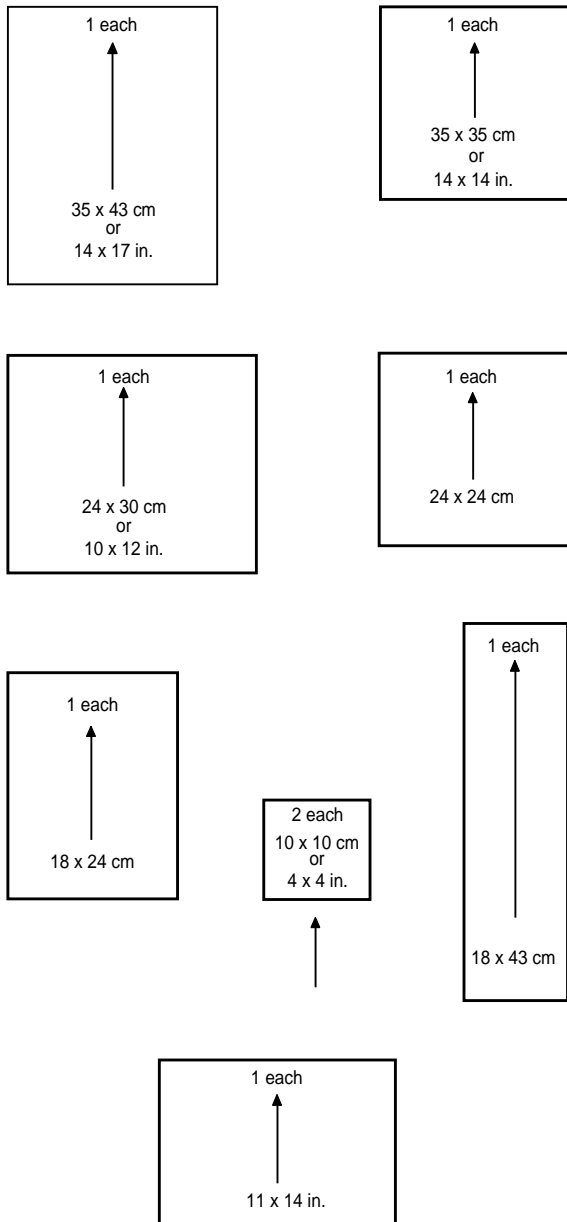
Cycle type	Developer Temperature			
Standard	33.3	0.3°C	92.0	0.5°F)
Rapid	34.4	0.3°C	94.0	0.5°F)

Note
The Temperature Ready Light flashes or turns off when the developer solution is at the correct temperature.

- [7] Press the Run/Standby Switch.
- [8] When the Temperature Ready Light flashes, feed a sheet of *Kodak* Roller Transport Cleanup Film into the Processor.
- [9] Adjust the Dryer Temperature Control Knob to the lowest setting to dry the film.

Feeding Sheet Film

Figure 4 Film Sizes and Direction of Film Feed



H172_1002CC

[1] Press the Run/Standby Switch.

Note

- The Motors will begin to operate.
- After film removal, the Processor will automatically return to the standby mode.
- The Temperature Ready Light flashes or turns off when the developer solution is at the correct temperature for processing film.

[2] Feed a sheet of film into the Processor.

Note

- Insert single-emulsion films with the emulsion side up.
- A film feed signal will sound 3 seconds after the trailing edge of a sheet of film has left the Rollers of the Detector Crossover Assembly.

Feeding Roll Film



Caution

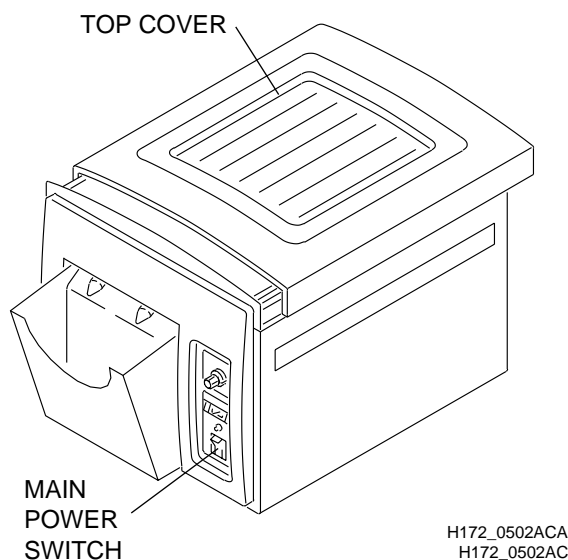
- Use only *3M SCOTCH* Brand Polyester Film Tape No. 850. Other types of tape are unacceptable, because their bases are soluble in the processing solutions.
- The adhesive side of the tape must not be exposed.

[1] Use a sheet of film as a leader.

[2] Use 2 cm (1 inch) wide *3M SCOTCH* Brand Polyester Film Tape No. 850 to connect the sheet of film to the roll film.

Shutdown

Figure 5 **Processor in Shutdown Mode**



- [1] Turn off the Main Power Switch and the water supply.
- [2] Disconnect the main power.
- [3] Remove the Top Cover and Evaporation Covers.
- [4] Do the “Daily procedure” on Page [15](#).



Important

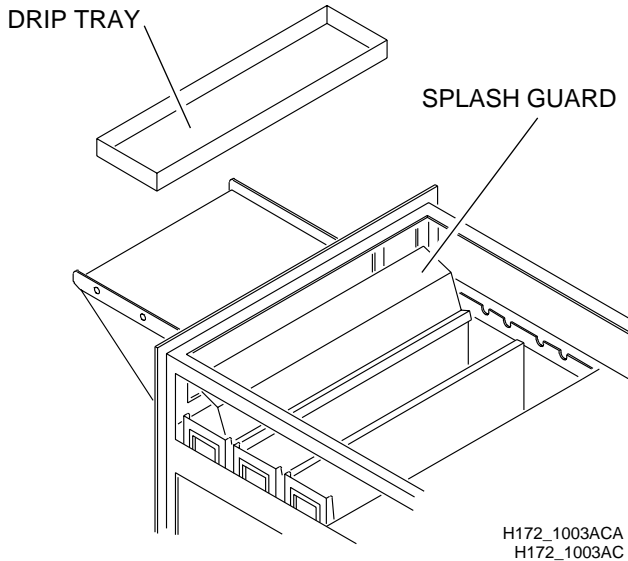
Keep the Top Cover open overnight for venting purposes.

- [5] Install the Top Cover with a 5 cm (2 in.) opening.

Section 3: Processing Solutions

Preparing the Solutions

Figure 6 Processing Tanks with the Splash Guard and the Drip Tray



Caution

- Avoid contamination of the processing solutions.
- To avoid spilling solutions from one Tank into the next one, use the Splash Guard between the developer and fixer Tanks.
- **Slowly** install or remove the Racks.
- Use the Drip Tray when moving Racks to or from the Processor.
- Do not mix more than a 2-week supply of chemicals.

[1] Mix the volume of processing solution required in the correct replenisher Tank. Use the instructions packed with the chemicals to mix the solution.



Note

Refer to Service Bulletin 30, Part No. 632661, for more information.

[2] Remove the Crossover Assembly and the Rack from the Tank that is to be filled.

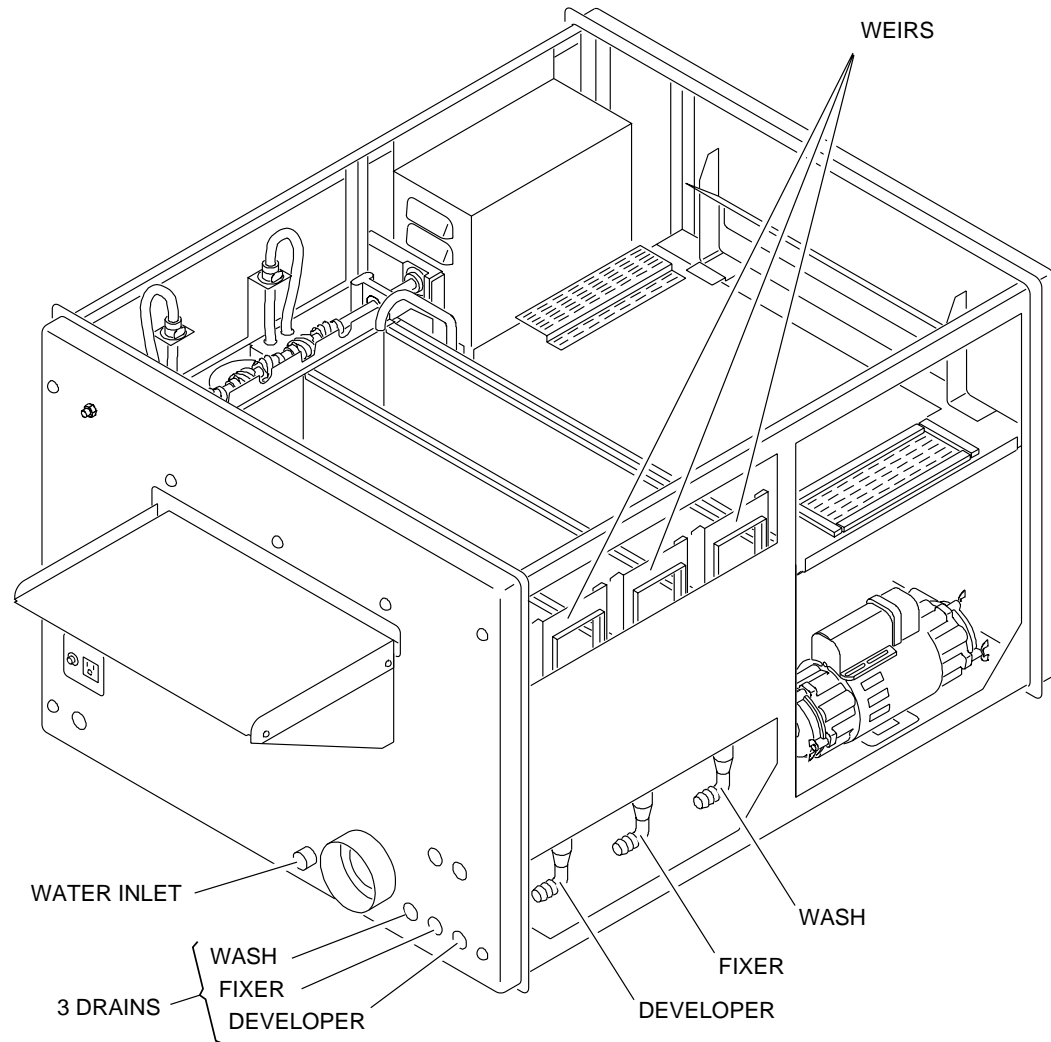
Draining the Tanks



Warning

- All drain material must be made of chemically resistant, non-corrosive material. Use PVC or the equivalent. The Drain must have a minimum diameter of 7.6 cm (3 in.) and no obstructions. See the Site Specifications, Publication No. 7C8769.
- Relatively small amounts of fixer can seriously contaminate the developer. If solutions are changed in both Tanks, fill **the fixer Tank first** so that any solution spilling into the developer Tank can be thoroughly cleaned.
- Drain only one Tank at a time.

Figure 7 Draining the Tanks



H172_0503DCA
H172_0503DC

- [1] If the Processor has a Silver Recovery Unit connected, disconnect the Fixer Drain Tube at the input side of the Silver Recovery Unit. See Figure 13 on Page 17.
- [2] Lift the blue Weir from the fixer Tank.
- [3] Drain the fixer solution. Check the local codes for the correct disposal procedures.



Important

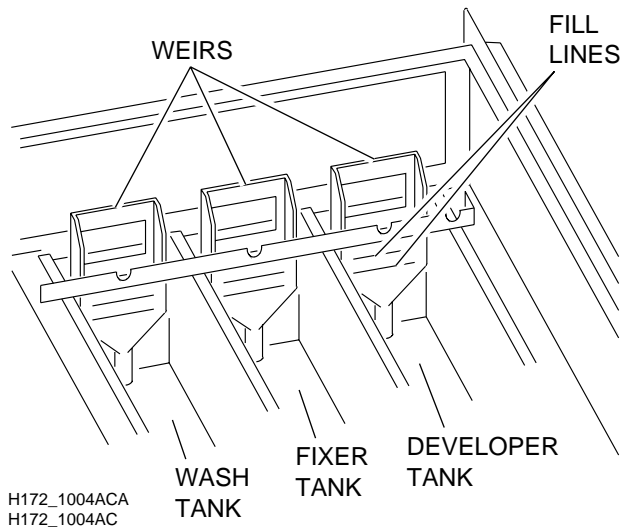
Do not interchange the Weirs.

- [4] When the fixer Tank is drained, install the blue Weir.
- [5] Drain the developer Tank in the same way.

Weir	Tank
red	developer
blue	fixer
beige	wash

Filling the Tanks

Figure 8



Caution

- Mix the developer solution first, then the fixer.
- Wash the mixing equipment thoroughly between solutions to avoid contamination of the solutions.
- Rinse the mixing and filling equipment before each use.
- Fill the fixer Tank **first**.

- [1] Install the Splash Guard between the developer Tank and the fixer Tank. See Figure 6 on Page 8.
- [2] To fill the fixer Tank, add fixer replenisher until the solution is at the higher Fill Line on the blue Weir.
- [3] Remove and rinse the Splash Guard.
- [4] Install the Splash Guard over the Fixer Tank.

- [5] To fill the developer Tank:

- (a) Fill the developer Tank **half full** of developer replenisher from the replenisher tank.
- (b) Add 190 mL (6.5 fl oz) of *Kodak RP X-Omat Developer Starter*.
- (c) Fill the developer Tank to the higher Fill Line on the red Weir with developer replenisher.

- [6] Remove the Splash Guard and rinse thoroughly with water.



Caution

When installing the Racks, use the Splash Guard. Lower the Racks slowly.

- [7] Install the Racks in the correct Tanks. Seat them firmly.



Note

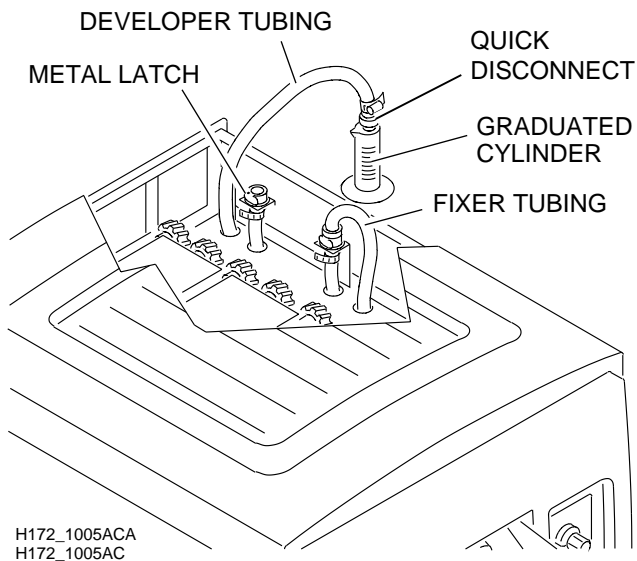
The Washer on the top of the drive side of the developer Rack has a “D” on it. The fixer Rack has an “F”. The Racks may also have red, blue, and white wire ties for easy identification:

- **red** for the developer Rack
- **blue** for the fixer Rack
- **white** for the wash Rack

- [8] Install the Crossover Assemblies, the Dryer Assembly, and the Evaporation Covers.
- [9] Allow the developer to reach the operating temperature before processing any film.

Section 4: Replenishment Flow Rates

Figure 9



Warning

Wear protective eyewear. The replenishment solutions are pumped quickly and might splash.

- [1] Remove the Top Cover.
- [2] Lift the Upper Roller of the Detector Crossover Assembly.
- [3] Check that the replenisher solutions flow freely through the Tubing located along the drive side of the Racks.
- [4] Disconnect the Developer Tubing by pressing the Metal Latch.



Note

The Developer Tubing may have a red Wire Tie on it for easy identification.

- [5] Pull the Developer Tubing slightly and rotate it over the edge of the frame and into a Graduated Cylinder.
- [6] Lift the Upper Roller of the Detector Crossover Assembly for the correct time:

Standard Cycle:	34 seconds
Rapid Cycle:	25 seconds

- [7] When the Replenishment Pump stops, check that the amount of solution in the Graduated Cylinder is correct for the film size and use condition. See the table on Page 12. If the amount is not correct, contact qualified service personnel.
- [8] Connect the Developer Tubing again by pushing it into the Metal Latch until the Developer Tubing locks in place.
- [9] Check the **fixer** replenishment flow rate by doing Steps 3 - 8 with the Fixer Tubing.
- [10] Install the Top Cover.

Figure 10 Detector Crossover Assembly

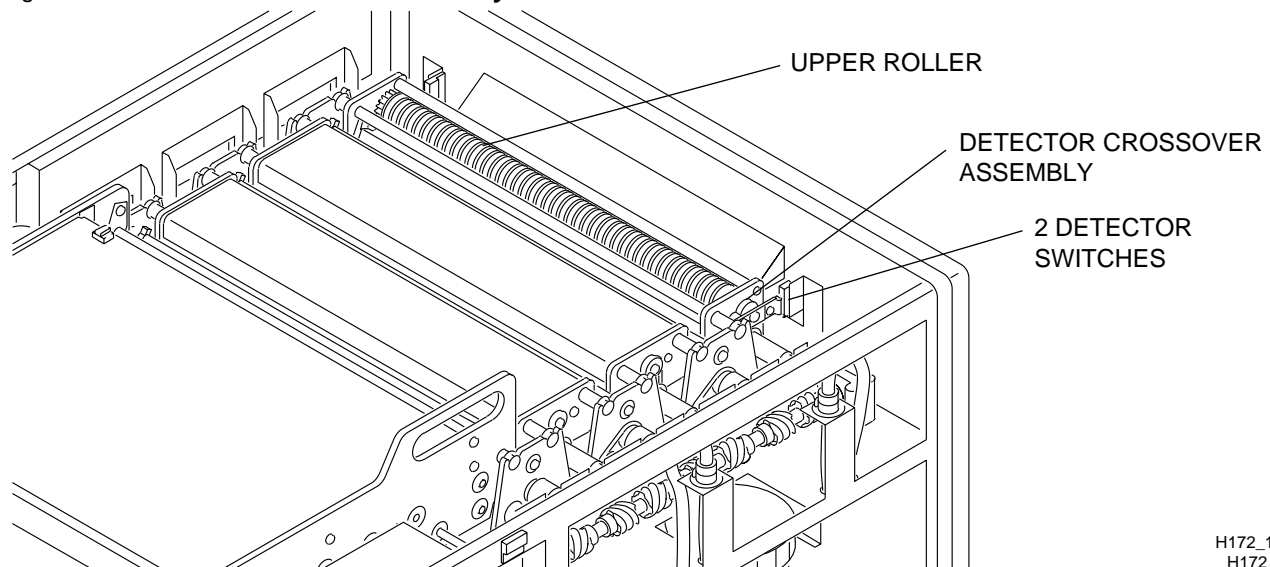


Table 1 Setting Replenishment Flow Rates

Film Size Processed	Use Condition	Average Amount of Film per 8 Hours of Processor Operation	Replenishment Flow Rate, mL per 35 x 43 cm 34 seconds for Standard Cycle 25 seconds for Rapid Cycle	
			Developer	Fixer
Only roll films 35 cm wide	High	105 Linear feet or more	50	70
	Medium	35 to 105 linear feet	65	85
	Low	35 linear feet or less*	80	100
Only 35 x 35 cm film	High	90 sheets or more	50	70
	Medium	30 to 90 sheets	65	85
	Low	30 sheets or less*	80	100
Average size intermix film	High	115 sheets or more	50	70
	Medium	40 to 115 sheets	65	85
	Low	40 sheets or less*	80	100
Only 35 x 43 cm film	High	75 sheets or more	60	85
	Medium	25 to 75 sheets	80	100
	Low	25 sheets or less*	100	120

* If sensitometry does not stay within control limits, flooded replenishment may be needed. Contact your Kodak Representative to order and install the Flooded Replenishment Kit, Part No. 419779.

**Note**

Refer to Service Bulletin 30, Part No. 632661, for additional information and the latest processing recommendations.

Section 5: Correcting Difficulties

1. Transport Failure					
2. Surface Artifacts					
3. Abnormal Film Densities					
4. Wet Films					
5. Low Solution Levels					
6. Overlapping of Films					
1	2	3	4	5	6
•					•
•	•	•	•		
•					•
•	•				
•			•		
	•		•		
	•	•	•	•	
	•				
•	•				•
•	•	•	•		•
•	•				•
•	•				•
•	•				•
•	•				•
•	•				•
		•			
•	•				
			•		
•					•
	•	•			

Film Feeding Error
Feed only single thicknesses of film. Feed the next film only after the film feed signal sounds. If there is no film feed signal, refer the difficulty to qualified service personnel.

Feed only compatible films.

Check that all Racks and Crossovers are seated correctly.

Check that the surfaces of all the Rollers are clean and smooth, especially in the Developer Turnaround Assembly.

Check that the Dryer Air Tubes are in the correct positions.

Remove any dirt from the Dryer Rollers and Air Tubes, especially the slots. Use a bottle brush and rinse with water.

Check that the replenishment settings are correct.

Adjust the Dryer temperature control setting to the **lowest** possible temperature that still allows good drying.

Clean the Feed Shelf and Detector Rollers.

Clean any biological growth in the Wash Tank with a mild solution of chlorine bleach. Use 60 mL (2 fl oz) of bleach per 3.8 L (1 gallon) of water. Wipe the Tanks with a soft sponge.

Check that the Weirs are seated correctly. Check that the Tanks are full.

Change any chemicals that were not mixed correctly, are exhausted, or are contaminated. Check that the replenishment flow rates are correctly set. Fill the Replenishment Tanks if necessary.

Check that all Rollers are in place and positioned and rotating correctly.

Check that all Roller Gears, Sprockets, and Idlers are engaged.

Replace any Roller that has a broken or worn Gudgeons.

Replace any Bearings that do not allow the Turnaround Rollers to rotate correctly.

Check the tension on the Rack Chain. Check that the Rollers do not hesitate and that the Chain moves smoothly.

With the Processor on, check for movement on the surface of the solutions. Movement indicates recirculation.

If the incoming wash water is dirty, clean the Rack and Tank thoroughly. Change the incoming Water Filter. Make sure to use the correct Water Filter.

Check that the Dryer Air Exhaust is free from any obstruction.

Check that the Turnaround Assembly is adjusted correctly. Make sure that the Turnaround Assemblies are square with the Racks.

Check the incoming water temperature. Temperature must be between 4.4 C (40 F) and 29.4 C (85 F).

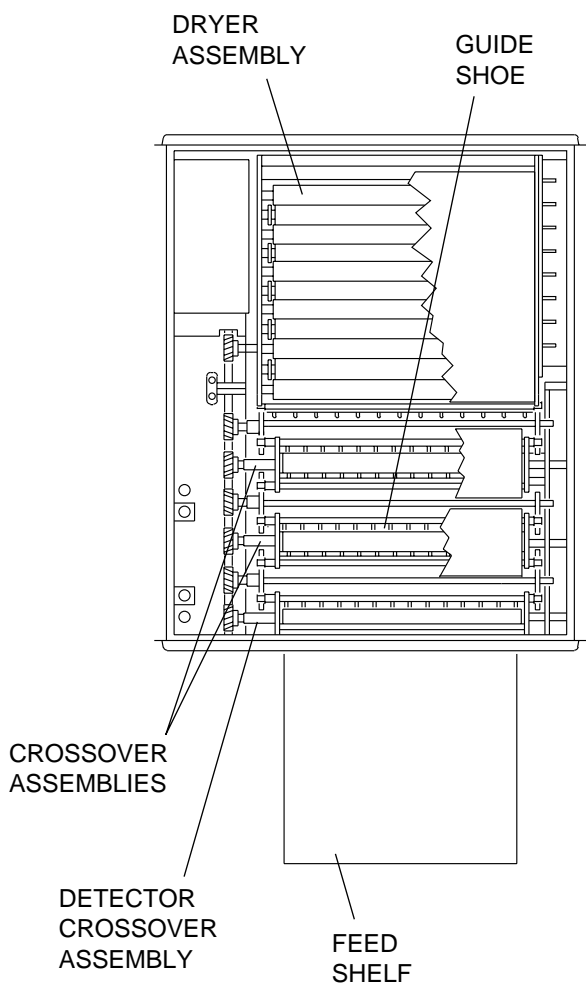
1. Transport Failure					
2. Surface Artifacts					
3. Abnormal Film Densities					
4. Wet Films					
5. Low Solution Levels					
6. Overlapping of Films					
1	2	3	4	5	6
		•			Check that the correct Bulb and Safelight Filter are in the Safelight and at the correct distance from the Feed Shelf and work surface.
•		•			Check that the Top Cover and Panels are tight on the Processor. Check that there are no leaks in the Lighttight Gasket.
•					10 x 10 cm films - feed films diagonally if they fail to transport reliably.
				•	Check the time delay. For all transport speeds, the buzzer should sound once the trailing edge of the film has advanced 75 mm (3 in.) into the Processor.
•	•	•			• Check that the tank solution levels are at the overflow Weirs.
				•	Check for solution in the Replenishment Tanks. Fill if necessary. NOTE: Mix developer replenisher in quantities not to exceed a 2-week supply.
		•			With a thermometer of known accuracy, check that the temperature of the developer is correct. If necessary, have qualified service personnel make adjustments. NOTE: Check the incoming water temperature. It must be a minimum of 4 C (7 F) lower than the desired developer temperature.

Section 6: Cleanup and Periodic Maintenance

Daily Procedure

The best time to do daily cleanup is at shutdown.

Figure 11 Daily Cleaning of the Racks and Crossover Assemblies



H172_1001CCB
H172_1001CC



Warning

- Dangerous Voltage. Disconnect the main power before doing any of the following cleanup procedures.
- Wear rubber gloves, safety glasses and protective clothing when doing any maintenance procedure.
- Report any change in the operating condition of the Processor to Service Personnel.

- [1] Turn off the Main Power Switch.
- [2] Disconnect the main power.
- [3] Turn off the water supply.
- [4] Remove the Top Cover.



Caution

- When removing the Crossover Assemblies, be careful to maintain squareness, and do not disturb the Guide Shoes.
 - Use a damp cloth or a synthetic sponge and warm water. **Do not use any abrasive material** on the Racks, Crossover Assemblies, or Squeegee Rollers.
- [5] Remove the Evaporation Covers and the Crossover Assemblies.
 - (a) Rinse the Evaporation Covers.
 - (b) Rinse the developer/fixer and fixer/wash Crossover Assemblies in warm water.
 - [6] Rotate and clean the Rollers with a soft brush and warm water.
 - [7] Dry the Rollers with a cloth or synthetic sponge or allow to air dry.

- [8] Wipe off all chemical deposits above the solution level in the processing section.
- [9] Clean off debris or buildup from the dryer area with a warm, damp sponge or cloth.
- [10] Install the Crossover Assemblies and the Evaporation Covers.



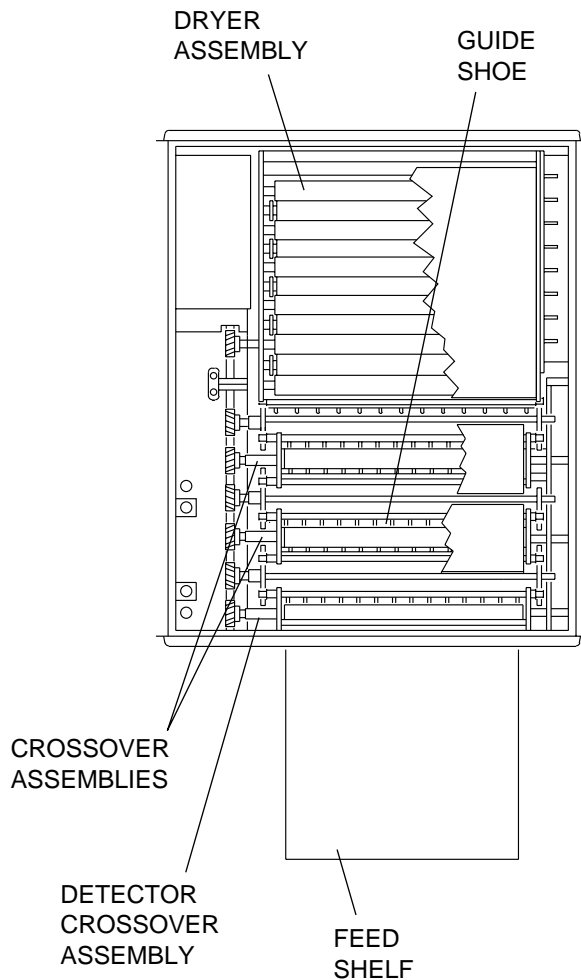
Important

Keep the Top Cover open overnight for venting purposes.

- [11] Install the Top Cover leaving a 5 cm (2 in.) gap.

Every Two Weeks

Figure 12 Biweekly Cleaning of the Racks and Crossover Assemblies



H172_1001CCB
H172_1001CC



Warning

Dangerous Voltage. Disconnect the main power before doing any of the following cleanup procedures.

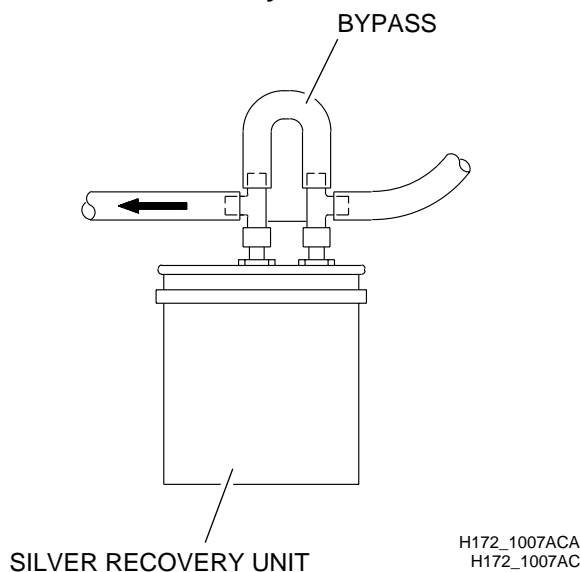
- [1] Turn off the Main Power Switch.
- [2] Disconnect the main power.
- [3] Turn off the water supply.
- [4] Remove the Top Cover.



Caution

- When removing the Crossover Assemblies, be careful to maintain squareness, and do not disturb the Guide Shoes.
 - Use a synthetic sponge and warm water. **Do not use any abrasive material** on the Racks, Crossover Assemblies, or Squeegee Rollers.
 - Do not rinse the Detector Crossover Assembly or the Dryer Assembly.
- [5] Remove the Evaporation Covers and the Crossover Assemblies.
 - (a) Rinse the Evaporation Covers.
 - (b) Rinse the developer/fixer and fixer/wash Crossover Assemblies in warm water.
 - [6] Rotate and clean the Rollers with a soft brush and warm water.
 - [7] Dry the Rollers with a damp cloth or synthetic sponge.
 - [8] Wipe off all chemical deposits above the solution level in the processing section.
 - [9] Remove the Dryer Assembly.
 - [10] Clean off debris or buildup from the dryer area and Dryer Assembly with a warm, damp sponge or cloth.

Figure 13 Silver Recovery Unit

**Caution**

- Fixer will contaminate the developer. When removing the Rack Assemblies, use the Splash Guard between the developer and fixer Tanks.
- Use the Drip Tray when removing or installing the Racks. See Figure 6 on Page 8.
- Do not rinse the Detector Crossover Assembly or the Dryer Assembly.

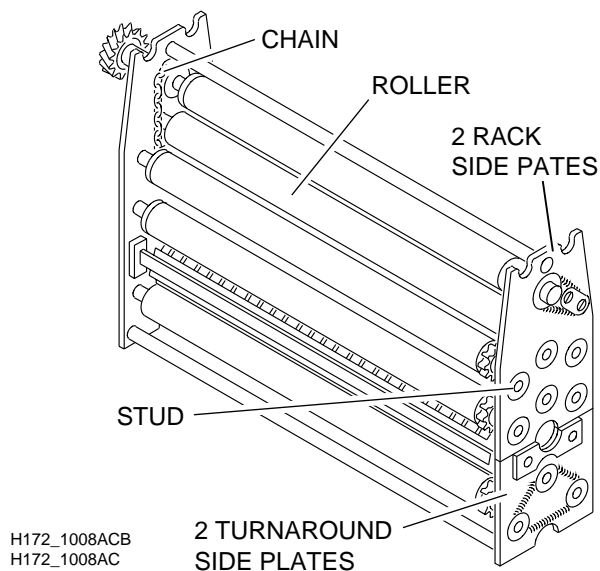
[11] Remove the Racks.

[12] Rinse the Racks and wipe them with a cloth.

[13] Check:

- (a) Chains move freely and are adjusted correctly
- (b) Rollers rotate correctly
- (c) Space between the Turnaround Side Plates and the Rack Side Plates is equal and that the Side Plates are parallel on both ends

Figure 14 Rack and Turnaround Assembly



[14] Check the operation of the Silver Recovery Unit, if installed.

[15] Check that no solution is flowing through the Bypass.

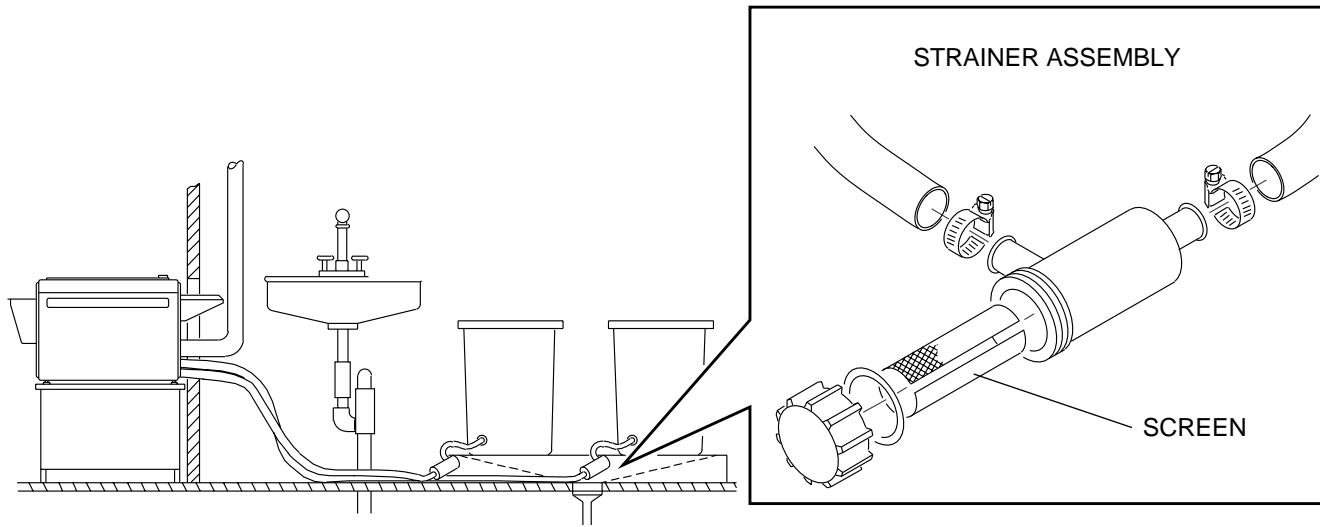
**Note**

If solution is present in the Bypass, the Silver Recovery Unit is not operating.

[16] Use *Kodak* Silver Estimating Test Papers to check the silver content of the solution flowing into the drain.

[17] If the test shows more than 1 gram/liter of silver, install a new cartridge in the Silver Recovery Unit.

Figure 15 Cleaning the Replenishment Strainer Assemblies



H172_1009BCA
H172_1009BC

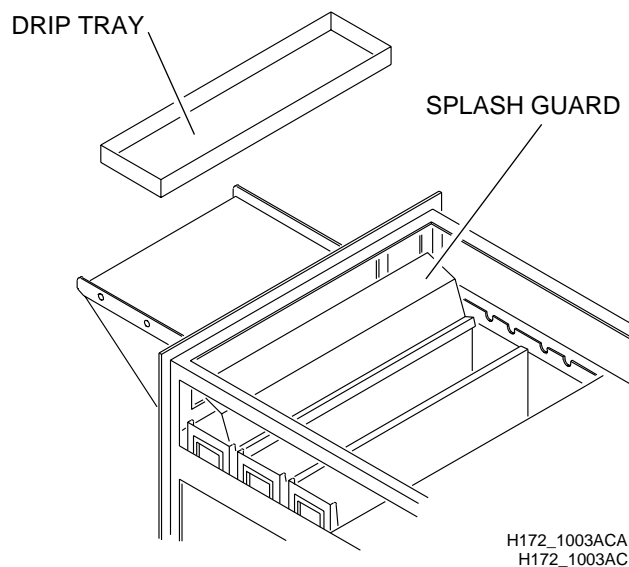
- [18] Clean the Replenishment Strainers when mixing new chemicals.
- (a) Place Pinch Clamps on The tubing to stop the replenishment flow.
 - (b) Disassemble the Strainer Assemblies.
 - (c) Use a brush and warm water to clean the Strainer Assemblies and to remove dirt and chemical deposits from the Screens.

Special Maintenance for Low or High Volume Usage

If the processor handles a **low volume**, less than 25 sheets of film per day, do this procedure **every 2 weeks**.

If the processor handles a **high volume**, more than 25 sheets of film per day, do this procedure **monthly**.

- [1] Use the Procedure on Page 8 to drain the Tanks.
- [2] Flush the developer and fixer Tanks with clean water.
- [3] Install the Weirs, red for developer and blue for fixer.
- [4] To fill the fixer Tank, add fixer replenisher until the solution is at the higher Fill Line on the blue Weir.
- [5] To fill the processor developer Tank:
 - (a) Add 190 mL (6.5 fl oz) of *Kodak RP X-Omat Developer Starter*.
 - (b) Fill the developer Tank to the higher Fill Line on the red Weir with developer-replenisher solution.

Figure 16 **Splash Guard and Drip Tray****Caution**

When installing the Racks, use the Splash Guard. Lower the Racks slowly.

- [6] Install the Racks, the Crossover Assemblies, and the Dryer Assembly. Check that each Assembly seats firmly.
- [7] Turn on the main power, the water, and the Processor.
- [8] Check the solutions. If the surfaces of the solutions are moving, the Recirculation Pumps are operating.
- [9] When the Temperature Ready Light flashes, use a thermometer of known accuracy and check the solution temperature in the developer Tank. The correct temperature is:

Standard Cycle	33.3 0.3°C (92.0 0.5°F)
Rapid Cycle	34.4 0.3°C (94.0 0.5°F)

Section 7: New Equipment Warranty

Warranty Coverage

Kodak warrants the *Kodak X-Omat 2000/2000A* Processors to function properly for 1 year from the date of initial installation, when installed within one year from the date of shipment.

If the equipment does not function properly during the warranty period, the dealer that sold the equipment will provide or arrange for repair of the equipment during the dealer's normal working hours. Such repair service will include any necessary adjustments and/or replacement of parts necessary to maintain your equipment in good working order.

How to Obtain Service

Should equipment require service, refer to the sales contract for details on whom to call for service, or contact the dealer that sold you the equipment.

Limitations

- Warranty service is limited to the contiguous United States, the island of Oahu in Hawaii, and certain areas of Alaska.
- This warranty does not cover: circumstances beyond Kodak's control; misuse; abuse; any attachments, accessories, or alterations not marketed by Kodak (including service or parts to correct problems resulting from the use of such attachments, accessories or alterations); failure to follow Kodak's operating instructions; or supply items.
- Kodak makes no other warranties, express, implied, or of merchantability for this equipment.
- Repair without charge is Kodak's and the dealer's only obligation under this warranty.
 - **Kodak will not be responsible for any consequential or incidental damages resulting from the sale, use, or improper functioning of this equipment even if loss or damage is caused by the negligence or other fault of Kodak.**
 - Such damages for which Kodak will not be responsible, include, but are not limited to, loss of revenue or profit, downtime costs, loss of use of the equipment, cost of any substitute equipment, facilities or services or claims of your customers for such damages.
- This limitation of liability will not apply to claims for injury to persons or damage to property caused by the sole negligence or fault of Kodak or by persons under its direction or control.

Publication History

Print Date	Pub No.	ECO No.	Affected Pages	File Name	Notes
Dec. 98	7C8770	N/A	All	om3554_1_03dec98.fm	First Printing.
Jan. 99	7C8770	N/A	Page 2	om3554_1_19jan99.fm	Added safety notice.

Kodak and *X-Omat* are trademarks.